High Level Design (HLD)

INCOME PREDICTION

Revision Number – 1.0

Last Date of Revision – 16-05-2023

SHAHIN ANJUM

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contents** | | | | | | | | | | | | | | | | | | | | | |  | |  |  |  |
| [**Abstract**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.gjdgxs) | | | | | |  | | | | | | | | | | | | | | | | [4](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.gjdgxs) | | | | |
|  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| [**INTRODUCTION**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.30j0zll) | | | | | | | | | |  | | | | | | | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.30j0zll) | | | | |
|  |  |  |  | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
|  | [**Why this HLD documentation?**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1fob9te) | | | | | | | | | | | | | | | | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1fob9te) | | | |  |
|  |  |  |  | |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  |
| [**1 Description**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2et92p0) | | | | | | | |  | | | | | | | | | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2et92p0) | | | | |
|  |  | |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
|  | [**1.1**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.tyjcwt) | |  |  | [**Problem Perspective**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.tyjcwt) | | | | | | | | | | | | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.tyjcwt) | | | |  |
|  |  | |  | |  | |  | |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  |
|  | [**1.2 Problem Statement**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3dy6vkm) | | | | | | | | | | | | | | |  | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3dy6vkm) | | | |  |
|  |  | | | | | |  | |  | |  |  |  |  |  |  |  | |  |  |  |  | |  | |  |
|  | [**1.3 Proposed Solution**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1t3h5sf) | | | | | | | | | | | | | | |  | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1t3h5sf) | | | |  |
|  |  | | | | | |  | |  | |  |  |  |  |  |  |  | |  |  |  |  | |  | |  |
|  | [**1.4 Solution Improvements**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.4d34og8) | | | | | | | | | | | | | | | | | | | | | [5](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.4d34og8) | | | |  |
|  |  | | | | | |  | |  | |  |  |  |  |  |  |  | |  |  |  |  | |  | |  |
|  | [**1.5 Technical Requirements**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2s8eyo1) | | | | | | | | | | | | | | | | | | |  | |  | | [6](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2s8eyo1) | |  |
|  | [**1.6 Data Requirements**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.17dp8vu) | | | | | | | | | | | | | | |  | | | | | | [6](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.17dp8vu) | | | |  |
|  |  | | | | | |  | |  | |  |  |  |  |  |  |  | | | |  |  | |  | |  |
|  | [**1.7 Tools Used**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3rdcrjn) | | | | | | | | | |  | | | | |  | | | | | | [7](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3rdcrjn) | | | | |
|  |  | |  |  | | |  | |  | |  |  |  |  |  | |  | | | |  |  | |  |  | |
|  | [**1.8**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.26in1rg) | |  | [**Constraints**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.26in1rg) | | | | | | | |  | | | | | | | | | | [7](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.26in1rg) | | | | |
|  |  | | | | | |  | |  | | |  |  |  |  | |  | | | |  |  | |  | | |
|  | [**1.9 Assumptions**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.lnxbz9) | | | | | | | | | | | | | | | | | | | | | [7](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.lnxbz9) | | | | |
|  | |  | | | | |  | |  | | |  |  |  |  | |  | | | |  |  | |  | | |
| [**2 Design Flow**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.35nkun2) | | | | | | | | |  | | | | | | | | | | | | | [7](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.35nkun2) | | | | |
|  |  | | | | | |  | |  | | |  |  | |  | |  | | | |  |  | | |  |  |
|  | [**2.1 Modelling Process**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1ksv4uv) | | | | | | | | | | | | | | | | | | | | | [8](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1ksv4uv) | | | |  |
|  |  | | | | | |  | | | | |  |  | |  | |  | | | |  |  | |  | |  |
|  | [**2.2 Deployment Process**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.44sinio) | | | | | | | | | | | | | | | | | | | | | [8](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.44sinio) | | | |  |
|  | |  | |  | | |  | | | | |  |  | | | |  | | | |  |  | |  | |  |
| **2.3** | | | | **Logging** | | | | | | | | | | | | | | | | | | 8 | | | |  |
| **2.2** | | | | **Error Handling** | | | | | | | | | | | | | | | | | | 8 | | | |  |
| [**3 Performance Evaluation**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.4i7ojhp) | | | | | | | | | | | | | | | | |  | | | | | [9](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.4i7ojhp) | | | |  |
|  | | |  |  | | |  | | | | |  |  | | | |  | | | |  |  | |  | |  |
|  | [**3.1**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2xcytpi) | |  | [**Reusability**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2xcytpi) | | | | | | | |  | | | | |  | | | | | [9](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.2xcytpi) | | | | |
|  |  | |  |  | | |  | | | | |  |  | | | |  | | | |  |  | |  | |  |
|  | [**3.2**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1ci93xb) | |  | [**Application Compatibility**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1ci93xb) | | | | | | | | | | | | | | | | | | [9](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.1ci93xb) | | | |  |
|  | [**3.3**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3whwml4) | |  | [**Resource Utilization**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3whwml4) | | | | | | | | | | | | |  | | | |  |  | | [9](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.3whwml4) | |  |
|  |  | | | | | |  | | | | | |  | | | |  | | | | |  | |  | |  |
|  |  | | | | |  | | | | | | | | | | | | | | | | |
|  |  | | | | | |  | | | | | |  | | | | | | | | |  | |  | | |
| [**Conclusion**](https://docs.google.com/document/d/1ZLlZEVdMuxYl3o0PziQjZcUbNmAcz-PR/edit#heading=h.qsh70q) | | | | | | | | | | | | | | | | | | | | | | 9 | | | | |

**Abstract**

­ For this Internship, I examine the Census Income dataset available at the UC Irvine Machine Learning Repository. I aim to predict whether an individual’s income will be greater than $50,000 per year based on several attributes from the census data.

**1 Introduction**

The US Adult Census dataset is a repository of 48,842 entries extracted from the 1994 US Census database. In our first section, we explore the data at face value in order to understand the trends and representations of certain demographics in the corpus. We then use this information in section two to form models to predict whether an individual made more or less than $50,000 in 1994. In the third section, we look into a couple papers written on the dataset to find out what methods they are using to gain insight on the same data. Finally, in the fourth section, we compare our models as well as that of others in order to find out what features are of significance, what methods are most effective, and gain an understanding of some of the intuition behind the numbers.

**1.1 Why this High-Level Design Document?**

The main purpose of this HLD documentation is to feature the required details of the project and supply the outline of the machine learning model and the written code. This additionally provides the careful description on however the complete project has been designed end-to-end.

**1.2 Description**

**Problem Perspective**

I am building a model to predict whether an individual’s income will be greater than $50,000 per year based on several attributes from the given census data.

**1.3 Problem Statement**

The most goal of the project is to form a programme that predicts the Income by taking bound input from the user like age, education, working hours and gender etc

**1.4. Project Solution**

Project requires the desired input of user from the created interface and method all the provided information to satisfy the wants of the machine learning model and at last show the expected output.

**1.5 Answer enhancements**

we will even predict the price of price tag considering whether or not is it a weekday, season or alternative social reasons. however, considering from the angle of business, if we have a tendency to method such information and predict the price of the discounted price tag it'll bring some loss to the airlines company. therefore, this technique isn't thought-about.

**1.6 Technical needs**

There are not any hardware needs needed for victimization this application, the user should have AN interactive device that has access to the web and should have the fundamental understanding of providing the input. And for the backend half the server should run all the package that's needed for the process and provided information to show the results.

**1.7 Information needs**

The info demand is totally supported the matter statement and the information set is accessible on the UCI within the type of standout sheet(.data), because the main theme of the project is to induce the expertise of real time issues, we have a tendency to once more mercantilism {the information into the prophetess data base and commerce it into csv format.

**1.8 Tools Used**

* Python 3.8 is employed because the programming language and frame works like numpy, pandas, sklearn and alternative modules for building the model.
* Vscode is employed as IDE(integrated development environment).
* For visualizations seaborn and components of matplotlib are getting used.
* For information assortment prophetess info is getting used.
* Front end development is completed victimization HTML/CSS.
* Flask is employed for each information and backend readying.
* GitHub is employed for version management.

**1.9 Constraints**

The Income prediction answer should be user friendly, as automatic as attainable and the user should not be needed to understand any of the operating.

**1.10 Assumptions**

The most objective of the project is to implement the utilization cases as for the new dataset that user provides through the programme. Machine learning model is employed for process the on top of computer file. It's additionally assumed that each one aspects of this project have the flexibility to figure along within the approach as the designer is expecting.

**2.3 Logging**

Each step is being logged within the system that runs internally, that shows the date time and therefore the processed that has been performed, work is completed in several layers as information, DEBUG, ERROR, WARNINGS. this provides US the perceive of the logged info.

**2.4 Error Handling**

Once ever a slip is occurred, the reason is logged in its several log file, in order that the developer will rectify the error.

**3 Performance analysis**

**3.1 Reusability**

Elements of the code written is accustomed different applications and therefore the rest is changed and be reused.

**3.2 Application Compatibility**

The various parts for this project are exploitation python as associate interface between them. every element can have its own tasks to perform, and it's the work of the python to make sure correct transfer of data.

**3.3 Resource Utilization**

Once any task is performed, it'll doubtless; use all the process power offered till that performs is finished.

**Conclusion**

The Income prediction will predict the worth supported the trained knowledge set within the rule. therefore, the user will know the income of any person.